

# Impact of Financial Leverage on the Value of Firm: Evidence from Some NSE Listed Companies

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## Abstract

The purpose of this paper is to investigate the impact of financial leverage on firm's value. For this purpose 31 NSE listed companies have been taken as a sample size from six different sectors. The study employed Fixed Effect (within) Regression Model as suggested by Hausman Test to find out the impact of financial leverage on firm's value. [All calculations have been done using STATA 13 and XLSTAT 2016 software]. The findings of the study reveals that there lay a significant negative relationship between Degree of Financial Leverage and the value of firm after controlling the variable Firm's Size.

**Keywords:** Financial Leverage, Value of Firm, Fixed Effect (within) Regression Model, Control Variable, Firm Size

## 1. Introduction

Modigliani and Miller (1958) in their theory of capital structure reported that capital structure does not have any impact on firm's value, but the prior literature put in the picture something else. A good number of studies revealed financial leverage significantly affects the value of firm. Some researchers (Jermias 2008; and others) are of the opinion that there is a positive relationship between leverage and the firm's value because they found that the use of debt financing in the capital structure ensures an increase in efficiency besides providing tax shield to the firm. On contrary few researchers (Phillips and Sipahioğlu, 2004; Qureshi, 2007; and others) are claiming of a negative association between leverage and firm's value. So far the literature is of concern, we found no concrete outlook of association between financial leverage and firm's value because of mixed findings. Hence, a detailed and systematic investigation is required on the aforesaid issue (i.e. Capital Structure - the mix of debt and equity capital). The main objective of this paper is to investigate the nature and degree of association between financial leverage and the value of firm of some selected NSE listed companies.



In accordance with the basic objective settled, the rest of the paper organized as follows: Section 2 shows the review of literature related to sustainable growth rate and its determinants. Section 3 and Section 4 dealt with the objective of the study and the research methodology respectively. Data analysis and empirical findings are presented in section 5 and the last section 6 concludes the paper.

## 2. Review of Literature

**Wipern (1966)** in his study accepts the traditional view that shareholders wealth is enhanced by the firm's judicious use of fixed commitment financing. The studies of **Ronald (1983)**, **Jameel (2004)**, and **Wipern (1966)** observed a positive relationship between value of the firm and financial leverage. **Titman and Wessels (1988)** reported that the firms, producing products needs specialized servicing and spare parts may find liquidation as a costly affair. This reflects that those firms which are basically engaged in manufacturing machines and equipment should be financed with relatively low debt capital. Again, **Ronald (1993)** stated that there is an extensive theoretical literature relating to optimal capital structure. But there is not so much of empirical evidence of a relation between changes in capital structure and firm value. **McConnell and Servaes (1995)** found an inverse association between the corporate value and firm's financial leverage for high growth firms. Another group of researchers, **Aivazian, Ge, and Qiu (2005)** found a negative relationship between financial leverage and investment of some Canadian firms. Stronger effect is found in case of low growth firms as compared to high growth firms. The study of **Aggarwal and Zhao (2007)** highlights how the growth of firms may have a bearing on the association between capital structure and performance. Their study found an inverse association between financial leverage and firm value in respect of high growth firms. However, positive relationship between the above two is found for low growth firms. **Kuben Rayan (2008)** in his study found an inverse relationship between financial leverage and firm value. The study of **Gulner (2008)** reported equity returns increase with leverage for some firms in industries such as utilities. But for other firms opposite result is noticed. **Cheng and Tzeng (2011)** in their study reported firm's with higher levels of leverage have higher values as compared to firms with lower levels of leverage. **Soumadi and Hayajneh (2012)** investigate the association between capital structure and performance of the public Jordanian companies listed at the Amman Stock Exchange. The results revealed capital structure is inversely associated with the firm performance but no significant difference is found between financial leverage of high growth firms and low growth firms on the firm performance. **Khan (2012)** examines the relationship between capital structure decision and firm performance on KSE listed engineering firms of Pakistan. A significant negative association is found between financial leverage and firm performance that is represented by Return on Assets, Gross Profit Margin and Tobin's Q. The relationship between financial leverage and firm performance represented by return on equity is found negative and insignificant. Also the asset size has an insignificant relationship with the firm performance measured by ROA and GM but negative and significant relationship is observed with Tobin's Q. **Fosu (2013)** investigate the association between capital structure, product market competition and firm performance in South Africa. He closely examines the impact of capital structure on firm performance which is represented by return on assets and Tobin's Q. Results revealed a positive and significant relationship between financial leverage and firm performance. It is also observed that product market competition plays a significant role regarding the relationship between firm performance and leverage as the former increases the

performance effect of leverage. **Raza (2013)** investigates the effect of financial leverage on financial performance on listed companies in KSE. An inverse relationship is found between financial performance and leverage. In his study, firm performance is measured by return on assets, return on equity and Tobin's Q. **Barakat (2014)** also studied the impact of financial arrangement, leverage and profitability on manufacturing companies of Saudi Arabia. He observed a positive relationship between independent variables, return on equity and capital structure, and the dependent variable stock market price. A weak and inverse relationship is found between financial leverage and stock value. A positive association is found between capital structure and ROE and significant association is found between capital structure and stock value. **Farooq and Masood (2016)** in their study found that financial leverage had a significant positive association with value of firm as measured by Tobin's Q. Whereas, they found that Firm size is negatively and insignificantly related with Tobin's Q.

### 3. Objective of the Study

The objective of this paper is to investigate the nature and degree of association between firm's financial leverage and value of the firm.

## 4. Research Methodology

### 4.1 Database:

The present study is based on the data gathered from secondary sources i.e. Capitaline Database and [www.nse.com](http://www.nse.com) website. The sample size of the study consists of NSE listed 31 companies selected based on purposive sampling out of six different sectors namely, consumer goods sector, energy sector, industrial manufacturing sector, automobile sector, pharmaceutical sector and financial services sector. The study covers a period of 10 years and it is conducted on the uniformly arranged data as per financial years.

### 4.2 Research Variables:

The variables used in this paper have been taken from the previous literature to draw a meaningful comparison with prior researches'. The value of firm is taken as dependent variable measured by Tobin's Q, whereas Financial leverage is an independent variable and firm size is a control variable. The definitions of the variables are given below:

#### 4.2.1 Dependent variable:

$$\text{Tobin's Q: } Q = \frac{\text{Market capitalization} + \text{Debt} + \text{Current liabilities}}{\text{Total Assets}}$$

#### 4.2.2 Independent variable:

$$\text{Financial leverage: Debt-equity ratio} = \frac{\text{Long term Debt}}{\text{Shareholder's fund}}$$

#### 4.2.3 Control variable:

Firm size: Natural Log of firm's total assets

### 4.3 Methodology:

There are 31 companies and 10 years. For the empirical investigation, there are three options:

i). Pooled OLS method: (31\*10) or 310 observations can be pooled and estimate a “grand” regression applying the following model.  $V_{it} = \beta_1 + \beta_2 X_{1it} + \beta_3 X_{2it} + \mu_{it}$ -----  
(1)

Where i (company) = 1, 2...31 and t (time) = 1, 2,3,4,5.....10. Here V= Value of the firm,  $X_1$ = Leverage (Debt Equity Ratio),  $X_2$ = Firm’s Size (ln of firm’s total assets)

In this particular model, it is assumed that regressors are non-stochastic, even if they are stochastic they are uncorrelated with the error term.

ii). The fixed effects least squares dummy variable (LSDV) model: In this model, 310 observations will be pooled as above, but the model allows each cross-section unit (in this particular case companies) to have its own (intercept) dummy variable. The model can be written as  $S_{it} = \beta_{1i} + \beta_2 X_{1it} + \beta_3 X_{2it} + \mu_{it}$ ----- (2). The subscript i and  $\beta_1$  suggest that the intercepts of the 31 companies may be different, but each company's intercept does not vary over time.

iii). The random effects model (REM): In this model, it is assumed that the intercept values are a random drawing from a bigger population of companies. In this case, 31 companies are drawn from a Universe of such companies and thus here a common mean value for the intercept ( $\beta_1$ ). The individual difference in the intercept value of each company is reflected in the error term ( $\varepsilon_i$ ).

Hence, the model can be represented as  $S_{it} = \beta_1 + \beta_2 X_{1it} + \beta_3 X_{2it} + \mu_{it} + \varepsilon_i$ .  
 $= \beta_1 + \beta_2 X_{1it} + \beta_3 X_{2it} + w_{it}$ ----(3)

Where,  $w_{it} = \mu_{it} + \varepsilon_i$ . Here  $\varepsilon_i$  is the individual specific or cross-sectional specific error component and  $\mu_{it}$  is the combined time series and cross sectional error component.

To select the appropriate model from the above, the following steps have been considered.

Step 1: Selection between Model 1 and Model 3: Breusch Pagan Test

From Model (iii) we get Variance ( $w_{it}$ ) =  $\sigma_\varepsilon^2 + \sigma_\mu^2$ ----- (4)

If  $\sigma_\varepsilon^2 = 0$  then there is no difference between model 1 and Model 3 and pooled OLS regression should be applied as per equation 1, since in this situation there are neither subject specific effects or they have all been accounted for in the explanatory variables.

To test for the presence of random effects **Breusch Pagan Test** is used. If Null Hypothesis

$H_0: \sigma_\mu^2 = 0$  then there are no random effects.

$$LM = \frac{NT}{2(T-1)} \left( \frac{\sum_{i=1}^N (\sum_{t=1}^T \hat{\varepsilon}_{it})^2}{\sum_{i=1}^N \sum_{t=1}^T \hat{\varepsilon}_{it}^2} - 1 \right)$$

Then the LM statistics has a Chi-square distribution with one difference. If the computed value of LM is significant then  $H_0$  will be rejected and there will be random effects.

### Step 2: Selection of fixed effects or random effects: Hausman Test

The idea behind Hausman Test is that both the random effects and fixed effects estimators are consistent if there is no correlation between  $\mu_i$  and the explanatory variables. If both estimators are consistent then in large samples the random effects and fixed effects estimates should be similar. On the contrary, if  $\mu_i$  is correlated with the explanatory variables the random effects estimator will be inconsistent.

The Hausman statistics is distributed as  $\chi^2$  and is computed as:

$$H = (b - B)'(V_b - V_B)^{-1}(b - B)$$

Where;

$b$  = is the coefficient vector from the consistent estimator.

$B$  = is the coefficient vector from the efficient estimator.

$V_b$  = is the covariance matrix of the consistent estimator.

$V_B$  = is the covariance matrix of the efficient estimator.

$H_0$  : Difference in the coefficient not systematic.

To use Hausman command in Stata the consistent fixed effects estimator is listed first and the efficient random effects is listed second.

If the H statistics is significant the  $H_0$  is rejected and fixed effect model is retained.

## 5. Results and Discussions

The findings of the study are reported below:

### 5.1 Table 1. Summary statistics (Quantitative data):

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. deviation
TOBIN'S Q	310	0	310	0.780	17.495	3.841	2.571
DFL	310	0	310	0.000	170.765	16.177	23.778
Firm's Size	310	0	310	4.395	12.661	8.872	1.626

**Source:** Author's own tabulation using XL STAT software

**Interpretation:** The above table 1 highlights descriptive statistics of the key variables and some control variables used in the present study. It can be observed from the above table that the

present study has 310 no. of observations with zero missing data. The mean value of the focused explanatory variables namely DFL, and Firm's size is 16.177 and 8.872 respectively, while the mean value of dependent variable TOBIN'S Q is 3.841.

### 5.2 Table 2. CORRELATION MATRIX

	DFL	Firm's Size	TOBIN'S Q
DFL	<b>1</b>	0.211	-0.399
Firm's Size	0.211	<b>1</b>	-0.516
TOBIN'S Q	-0.399	-0.516	<b>1</b>

**Source:** Author's own tabulation using XL STAT software

**Interpretation:** The above-mentioned Table 2 put emphasis on the relationship between dependent variable and independent variables used in the study. The table highlights that TOBIN'S Q (i.e. value of the firm) has a negative relationship with DFL and Firm's Size. Moreover, we observed that the correlation amongst the selected explanatory variables is minimal i.e. below 0.80, this signifies no multi-co linearity problem lies amongst the explanatory variables used in the study.

### 5.3 Table 3. MULTI CO LINEARITY STATISTICS

	DFL	Firm's Size
Tolerance	0.956	0.956
VIF	1.046	1.046

**Source:** Author's own tabulation using XL STAT software

**Interpretation:** The above Table 3 reports of Multi-co linearity Statistics. It can be observed that the VIF value of the selected explanatory variables is below the maximum level of VIF i.e. '5'. Further, the tolerance value of the selected explanatory variables is above '0.20' (rule of thumb). Hence, there is no sign of multi-co linearity problem among the selected explanatory variables.

### 5.4 Table 4: RANDOM-EFFECTS GLS REGRESSION

Random-effects GLS regression	Number of obs = 310
Group variable: srlno	Number of groups = 31

R-sq: within = 0.0109		Obs per group: min = 10				
between = 0.5805		avg = 10.0				
overall = 0.3321		max = 10				
corr(u_i, X) = 0 (assumed)		Wald chi2(7) = 20.14		Prob> chi2 = 0.0000		
	Coef.	Std. Err.	z	P> z	Lower bound (95%)	Upper bound (95%)
TOBINSQ						
DFL	-0.0203551	0.0061849	-3.29	0.001	-0.0324773	-0.0082329
Firm Size	-0.234803	0.1190857	-1.97	0.049	-0.4682067	-0.0013992
_CONS---	6.252953	1.065523	5.87	0.000	4.164565	8.34134
Sigma u	1.3299664	(fraction of variance due to u_i)				
Sigma e	1.4757422					
rho	.44818302					

**Source:** Author's own tabulation using STATA software

**Interpretation:** The above table informs about the result of REM. The result of REM shows that R squared is 0.3321. This indicates almost 33% change in the Firm's Value was explained by Leverage and Firm's Size.

From the above table 4, we observed there is a significant negative association between Leverage and the Firm's Value and it is statistically significant at 1% level. Further, the above result highlights Firm Size (Control Variable) also has a significant negative linkage with the Firm's Performance.

### **5.5 Table 5. BREUSCH AND PAGAN LAGRANGIAN MULTIPLIER TEST FOR RANDOM EFFECTS**

$$\text{TOBINSQ}[\text{SLNO},t] = \mathbf{Xb} + \mathbf{u}[\text{SLNO}] + \mathbf{e}[\text{SLNO},t]$$

**Estimated results:**

	Var	sd = sqrt(Var)
TOBINSQ	6.612549	2.571488

e	2.177815	1.475742
u	1.768811	1.329966
Test: $\text{Var}(u) = 0$ $\text{chibar2}(01) = 205.10$ $\text{Prob} > \text{chibar2} = 0.0000$		

**Source:** Author's own tabulation using STATA software

**Interpretation:** The above table reports the result of Breusch and Pagan Lagrangian Multiplier Test (BP test). Breusch and Pagan Lagrangian Multiplier Test (BP test) help to determine the best fit model between Pooled OLS and REM for conducting the undertaken study. From the Table 5 we found, the LM statistic i.e.  $\text{chibar2}(01) = 205.10$  and  $\text{Prob} > \text{chibar2} = 0.0000$  that depicts the outcome is significant at 1% level. Therefore,  $H_0$  is rejected and  $H_1$  is accepted.

Based on the above test outcome, it can be asserted the results of REM (as shown in Table 4) could be accepted and the Pooled OLS Model is not a good fit in this particular study. But, there is an urgency to run FEM also for more precise analysis as shown in Table 7 and carry further tests.

### 5.6 Table 6. HAUSMAN TEST

---- Coefficients ----	(b)	(B)	(b-B)	$\text{sqrt}(\text{diag}(V_b - V_B))$
-	FEM	REM	Difference	S.E.
DFL	-0.0202524	-0.0203551	0.0001027	0.002629
Firm Size	0.2593437	-0.234803	0.4941466	0.0965776
b = consistent under $H_0$ and $H_a$ ; obtained from xtreg B = inconsistent under $H_a$ , efficient under $H_0$ ; obtained from xtreg Test: $H_0$ : difference in coefficients not systematic $\text{chi2}(2) = (b-B)'[(V_b - V_B)^{-1}](b-B)$ $= 39.17$ $\text{Prob} > \text{chi2} = 0.0000$				

**Source:** Author's own tabulation using STATA software

**Interpretation:** The above-mentioned Table 6, explains whether to keep FEM or REM as a preferred model for the present study. The above Hausman test statistics highlights  $\text{chi2}(7) = 39.17$  and  $\text{Prob} > \text{chi2} = 0.0000$  i.e. less than 0.05 which is significant. Therefore, we reject the null hypothesis ( $H_0$ ).

Hence, it can be asserted from the above table that the results of FEM (as shown in Table 7) should be accepted, but the REM is not a good fit in this particular study as suggested by Hausman test statistics.

### 5.7 Table 7. FIXED-EFFECTS (WITHIN) REGRESSION

Fixed-effects (within) regression		Number of obs. = 310				
Group variable: srlno		Number of groups = 31				
R-sq: within = 0.0333		Obs. per group: min = 10				
between = 0.0149		avg. = 10.0				
overall = 0.0020		max. = 10				
corr(u <sub>i</sub> , Xb) = -0.3024		F(2,277) = 4.78				
		Prob> F = 0.0091				
TOBINSQ	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
DFL	-0.0202524	0.0067205	-3.01	0.003	-0.0334821	-0.0070226
Firm Size	.2593437	.1533253	1.69	0.092	-0.0424871	0.5611745
_CONS---	1.867389	1.329119	1.40	0.161	-.7490686	4.483847
sigma_u 2.2953058						
sigma_e 1.4757422						
rho .70752836 (fraction of variance due to u <sub>i</sub> )						
F test that all u <sub>i</sub> =0: F(30, 277) = 10.96 Prob> F = 0.0000						

**Source:** Author's own tabulation using STATA software

**Interpretation:** The above-mentioned Table 7, describes the relationship between explanatory variables and outcome variables within an entity. This model helps to analyze the impact of variables that vary over time. From the above table 7, we observed there is a significant negative association between Leverage and the Firm's Value and it is statistically significant at 1% level. This depicts that with every additional unit of leverage, the firm value tends to decrease by 0.0202524 units and vice-versa. It may be possibly due to the reason that higher leverage increases the fixed financial charges as a result firm's value deteriorate

But, no evidence of relationship could be traced out of the above results between firm's size (control variable) with the Firm's Value.

## 6. Conclusion

Every firm should maintain a balanced capital structure neither too much of debts nor too much equity is desirable. A proper blend of the two is required for the long-term survival and growth of the firm.

The findings of our study revealed there lay a negative association between Firm's Financial Leverage and value of the firm after controlling the variables firm size. Hence, it can be concluded from the above study that with the increase in debt in the capital structure, the firm's value has a propensity to deteriorate. This may be possibly due to the reason that higher leverage increases the fixed financial charges as a result firm's value deteriorate.

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